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DIVISION OF BIOLOGY AND MEDICINE

JANUARY, 1951

(324)

Research Projects Approved During January, 1951

The following projects were approved for negotiation or renewal during January 1951:

	No. of Projects	Amount
Biology	8	$ 58,226
Biophysics	1	14,196
Medical	7	217,203
Total	16	$ 289,627

Biology

University of Idaho - $12,528 (1 year)
Investigators: Drs. T. S. Buchanan, W.K. Ferrell and E. E. Hubert
Title: "A Study of Absorption and Translocation of Mineral Elements in Diseased and Healthy Western White Pine by the Use of Radioactive Materials."

Johns Hopkins University - Contract AT(30-1)-933 - $4496
Investigators: Drs. Robert Ballentine and Wm. D. McElroy
Title: "The Interrelationship of Cobalt-Proteins and Vitamin B-12"
(Supplement to present contract to make total of $10,764 for 6-15-50 to 6-15-51).

Utah State Agricultural College - Contract AT(11-1)-80
Amount: $4615 (1 year renewal)
Investigator: Dr. Clyde Biddulph
Title: "The Use of Radioisotopes in the Study of Reproduction"

State College of Washington - $3524 (1 year)
Investigator: Dr. H. Bayard Milne
Title: "The Effect of X-rays upon the Optical Specificity of Papain."

State College of Washington - $7992 (1 year)
Investigators: Drs. C. O. Stanberry and F. J. Viets
Title: "The Zinc Nutrition of Plants in Calcareous Soils".

Johns Hopkins University - Contract AT(30-1)-851 - $16,173 (1 yr. renewal)
Investigators: Drs. Wm. D. McElroy and Carl P. Swanson
Title: "Modification through the use of Supplementary Environmental Factors of the Frequency of Gene and Chromosome Changes Induced by X-rays, Ultraviolet Light and Mustard Nitrogen.

Louisiana State University and A & M College - $2590 (1 year)
Investigators: Drs. John F. Christman and Virginia Williams
Title: "The Effect of Biotin on Acetate."

Michigan State College - $6,308 (1 year)
Investigators: Drs. R. U. Byerrum and C. D. Ball
Title: "Transmethylation in Plants"

Biophysics

Idaho State College, Pocatello, Idaho - $14,198 (1 year)
Investigators: Drs. Carl W. McIntosh and A. E. Taylor
Title: "Determination of Quantities of Certain Radioactive Material in Ground Water and Soil of Areas in and Adjacent to the Reactor Testing Station."

Medicine

Harvard University Medical School - Massachusetts General Hospital
Investigator: Dr. William H. Sweet. Amount: $30,150 (1 year)
Title: "The Use of Thermal and Epithermal Neutrons in the Treatment of Neoplasms."

Northwestern University - Contract AT(11-1)-94 - $10,000(1 year renewal)
Investigators: Drs. John A. D. Cooper and Howard L. Alt.
Title: "The Diagnostic and Therapeutic Use of Radioisotopes in Experimental Medicine; Radiobiology Training Program."

University of Georgia - Contract AT(40-1)-232 - $7567 (1 year renewal)
Investigator: Dr. S. A. Singal
Title: "Effect of Nutritional Deficiencies on the Synthesis of Nucleoprotein and Phospholipid."

University of Minnesota - Contract AT(11-1)-108 - $23,792 (1 year renewal) plus $3,186 for last period of present contract.
Investigator: Dr. Samuel Schwartz
Title: "Synthesis of Hemaglobin in Bone Marrow and Multiplication of Blood Cells. Studies in Chemical Hematology."

Harvard University - Contract AT(30-1)-609 - $83,653 (1 year renewal)
Part I - Investigators: Drs. A. K. Solomon and S. J. Gray.
Title: "Isotope Technique Research; Use of Isotopes on Medical Problems."
Part II - Investigator: Dr. A. Baird Hastings - $14,177 (1 yr. renewal)
Title: "Use of Isotopes to Study the Metabolism of Organic Substances in Mammalian Tissues."
Part IV - Investigator: Dr. J. C. Aub - $23,563 (1 year renewal)
Title: "Study of Metabolic Activities of Living Organisms by Means of Suitable Isotopes."

Georgetown University - Contract AT(30-1)-838 - $8,000 (1 year renewal)
Investigator: Dr. Charles F. Geschickter
Title: "Study of the Distribution of Bivalent Metallic Ions as Influenced by Chelating Compounds."

Harvard University, Medical School, Howe School of Ophthalmology
Investigator: Dr. David G. Cogan - $16,461 (1 year)
Title: "Stereophotography of Anterior Segment of Eye with Special Reference to Crystalline Lens".

Advisory Committee for Biology and Medicine [redacted]

The ACBM held their 25th meeting at the NRC in Richland, Washington on January 12 and 13, 1951.

Dr. Ernest Goodpasture, a member of the Committee, and Dr. Willard Machle, of the NRC, reported on their trip to Japan and the study now in progress by the Atomic Bomb Casualty Commission of the effect upon the population of Hiroshima and Nagasaki of radiation emanating from the explosions of atomic bombs in 1945. As a result of the investigations made by Dr. Goodpasture and Dr. Machle and due to the unsettled international situation and the difficulty in obtaining qualified personnel, it was the sense of the Committee that the scope of the work in Japan during the fiscal year 1952 should be reduced.

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Biology Branch

Effect of Radiation on Work Capacity

The staff of the Biology Branch has held several conferences on proposed experiments on the effects of radiation on work capacity. While some information is available on the rat, the current discussions have been concerned with the studies on the dog. The groups participating in the planning include representatives of the NSFA Committee, the Navy and the University of California. The project is being set up to give information on both work capacity and longevity. The minimum level of exposure will be 100 r and the maximum 300 r. The exposures will be both single and intermittent doses varying both in the number of r per exposure period and the period between exposures. The capacity to perform physical work will be measured at varying times following exposures.

Applied Fisheries Laboratory - University of Washington

Dr. Curt Stern, a member of the ACBM and Dr. M. M. Zelle of the Biology Branch, spent January 15 and 16 visiting the Applied Fisheries Laboratory at the University of Washington in Seattle. While the whole research program of the Laboratory was reviewed, particular emphasis was placed upon the genetics program. The quantitative aspects of the program were considered and the preliminary cytological studies evaluated. It was felt that the rainbow trout program has succeeded in its initial objective of demonstrating genetic changes in trout following radiation exposure. However, the quantitative relation between radiation dosage and genetic changes will be difficult to determine. Dr. Stern and Dr. Zelle are preparing recommendations for future work in this field.

Medical Branch

University of Rochester Research

Pilot studies on the therapy of acute radiation injury are in progress at the University of Rochester Atomic Energy Project. A large scale definitive therapeutic program will be underway by April 1 with joint support by the AEC and the Armed Forces Special Weapons Project. It is expected that within 12 to 18 months the progress will yield data upon which reliable recommendations for the treatment of human radiation casualties may be based.

Biophysics Branch

Participation in the Nevada Tests

A member of the Biophysics Branch (together with representatives of the Medical Branch and Military Applications Division) visited the Los Alamos Scientific Laboratory, and toured the Nevada test site and adjoining areas, for the purpose of consulting on questions of radiological health hazards, monitoring plans, etc. in connection with the forthcoming nuclear tests. The consultation resulted in general approval of the plans from a health viewpoint, and statements of the approval were presented to the Joint Congressional Committee and to the press.

In connection with the Nevada tests, arrangements were made with the Hanford, Argonne, Brookhaven and Oak Ridge Laboratories to set up air monitoring stations in fifteen different locations, covering the entire United States. These studies were made in addition to the Los Alamos studies which were confined to a 500-mile radius from the site, and to Air Force studies made from planes. A summary of the results will appear after the tests.

Two members of the Biophysics Branch attended the Nevada tests, for the purpose of observing the operations and to study the results of the monitoring operations. These studies have given first-hand information on the behavior of radioactive products from the explosions, and contribute to our ability to estimate health hazards from such bursts. The experience has much value in considering future tests and in Civil Defense planning.

Arrangements were made through the Branch for the participation in the monitoring activities, of a representative from each of the 18 AEC emergency monitoring teams. It is the expectation that the knowledge and experience gained by these representatives will be communicated to the other members of the teams. A member of the Biophysics Branch participated in this activity, as a representative of the Washington emergency team.

Levels of radioactivity in water and food that can be permitted under emergency conditions following an A-bomb blast or other nuclear explosion were formulated to furnish guidance under such conditions. If the water is to be consumed for 10 days, it was calculated that it could contain as much as 0.09 microcuries of beta-gamma radioactivity per cubic centimeter

of water, or 0.005 microcuries of alpha activity per cc. Should conditions require that the contaminated water be consumed for thirty days following the explosion, the permissible concentrations would be 0.03 microcuries of beta-gamma activity or 0.0017 microcuries of alpha activity per cc of water.

It is emphasized that these are not peace-time permissible limits of radioactivity for either long- or short-term consumption. Responsible officials can utilize these values during periods of emergency, however, with the conviction that water with a radioactive content less than these limits can be used with no real hazard. The values can be considered as applying to food as well as water. Emergency radiation monitoring teams will find it possible to measure these concentrations of radioactivity with their standard equipment.

These emergency values have been accepted by the Federal Civil Defense Administration for issuance by it.

Health Physics Conference

The Biophysics Branch of the Division of Biology and Medicine sponsored through Argonne National Laboratory a health physics conference on January 16, 17 and 18. This was the first time that a meeting has been held solely for the purpose of discussing the health physics (radiation protection) problems encountered within the AEC installations. The meeting had a two-fold purpose, namely to encourage an exchange of ideas and thoughts on mutual problems and to provide the latest information on the various research and development programs. There were approximately 175 persons in attendance at the meeting representing all of the AEC Operations Offices and the majority of their contractors.

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A representative of the Branch, in cooperation with the Division of Research attended a meeting at Argonne National Laboratory on Friday, January 19, with representatives of AFOAT, ANL, and Hanford to discuss the possibility of Hanford's participating in an experiment designed to trace the flow of radioactive off-gases from Hanford's process. It was agreed that the proposed experiment had some merit and should be undertaken provided the Hanford representatives satisfied themselves that there would be no health hazard to people or environment from the operation.

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Civil Defense Liaison Branch

Emergency Permissible Levels of Radiation

Emergency permissible levels of radioactivity in food and water, prepared for use by AEC emergency radiation monitoring teams in event of atomic disaster, were dispatched to Managers of Operations on January 3 for distribution to the 18 teams. These levels were previously furnished to NSRB and FCDA for use in the national civil defense program.

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On January 24 further information relating to permissible levels of radiation was given FCDA. This consisted of the standards for chronic exposure to external radiation and to internal emitters (the Harwell values agreed upon by Great Britain, Canada and the U.S.); and permissible emergency exposures for AEC monitoring team personnel, established as follows:

1. 10 r - for those individuals expected to receive exposures in the course of their regular duties as AEC personnel.

2. 25 r - for those individuals not expected to receive exposure in the normal course of their duties.

Loan of Radiation Detection Instruments and Sources for Civil Defense Training Purposes

On January 5 a joint memorandum of the Directors of Research and Biology and Medicine to the Director, Isotopes Division, outlined the agreed-upon administrative and financial arrangements to govern the loan of radioactive isotopes for civil defense training. Costs of this program will be met from funds available to the Division of Biology and Medicine.

During the month loans of instruments and/or sources were arranged through the Operations Offices and the Isotopes Division, OROO, with approval of the FCDA, for civil defense training courses to be given by Ohio State University, University of Nebraska, Iowa State University, the cities of Milwaukee, Wisconsin, and Berkeley, California, and the State of Connecticut.

Slides from "The Effects of Atomic Weapons"

In response to requests for training material from graduates of the radiological monitoring courses held last year, Brookhaven National Laboratory has arranged for the production of a set of 72 slides of selected figures, charts and photographs from "The Effects of Atomic Weapons." Information concerning procurement of slides has been furnished interested AEC organizations, the NSAB and the FCDA.

Radiation Instruments Branch

The AEC sponsored programs for the development of instrumentation techniques for possible civil defense use were summarized in a letter sent to the FCDA on January 9. The purpose of the letter was: (1) to inform the FCDA of the status of these programs, (2) to determine if they were interested in having the AEC instrumentation groups further concern themselves with civil defense instrument development, and (3) to request their advice relative to taking certain AEC developed prototypes through a commercial engineering phase.

A draft of a report summarizing Department of Defense sponsored projects in radiation detection instrumentation has been completed and is being presently reviewed by the responsible military agencies prior to reproduction for AEC internal distribution. Some of these activities were briefly reviewed in a paper given at the Health Physics Conference sponsored by ANL in Chicago on January 16-18, 1951.

A paper on "The Role of Instrumentation in Civil Defense" was presented at the AIEE Winter General Meeting held in New York City on January 22-26-, 1951.

As was noted in the November Monthly Progress Report, the Radiation Instruments Branch has been directed by the General Manager to investigate various radiation detection instruments capable of detecting atomic weapons and fissionable materials which might be smuggled into the United States aboard ship. A meeting was held jointly with members of the Division of Military Application and the Research Division on January 31, 1951 to discuss with a Dr. Elwood B. Gilfillan, Jr., of the Old Dominion Research and Development Corporation of Arlington, Virginia, his ideas on how this problem could be dealt with. As a result of this meeting, he was invi ed to submit a proposal covering a feasibility study.